A TWO-PERIOD, SINGLE PRODUCT STOCHASTIC INVENTORY MODEL USING PERISHABLE AND SEASONAL RAW MATERIALS

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ABSTRACT

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Perishable and seasonal items demand greater attention and consideration since they require delicate management. Among the ranks of such items are basic commodities like food products. The need for effective management of these types of inventories is amplified by the agricultural base of the Philippine economy and the emerging trend in agri-business and export opportunities. 'This study presents a model for controlling perishable and seasonal inventory in a manufacturing setting.

The proponent's main concern is to help find a way to solve the food management problem by creating a model that determines how much raw material to order and the quantity of finished product to produce at each period. The outputs of the model should minimize total costs which include set-up, ordering backlogging, carrying (for both finished good and raw material), acquisition and production costs, as well as a salvage value for spoiled materials.

Three models were formulated to show the various effects of seasonality on perishable inventory models. The three models include the out-of-season model, the in-season model and the combined model. The decision as to which type of model is applicable depends on the period or "season" in which the model is to be used. For example, if order releases have to be made during two consecutive out-of-season periods, then the out-of-season model has to be used. If two in-season periods are involved, then the in-season model will be applicable. For situations involving one in-season period and one out-of-season period, the combined model could be used.

All three models were tested for convexity using unconstrained optimization techniques. The problem was then solved by decomposing the original model into the finished good model and the raw material model. Two numerical examples, one for the finished good model and one for the raw material model, were presented. Unconstrained optimization techniques and the Solver-Q software were then used to come up with the solution of the decomposed models.